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## Combined Meso / Microscale Modeling of the Wind Climate for Wind Power Estimations

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The method of combining the Karlsruhe Atmospheric Mesoscale Model KAMM (Adrian and Fiedler, 1991; Adrian, 1994) and the Wind Atlas Analysis and Application Program WAsP (Troen and Petersen, 1989; Mortensen et al., 1993) to make local predictions of the wind climate for wind energy purposes is explained and some results are shown.

The wind is a very local quantity being influenced already by small hills, or roughness differences as e.g. between sand and bushes (see e.g., Mortensen and Petersen, 1997). WAsP is a model which "cleans" measurements from these local influences to obtain values that are more representative for the wind climate. The cleaned measurements form a "wind atlas" for the area around the site. The wind atlas is used to predict the actual wind at other sites with similar overall wind climate. However, to get a wind resource map of a larger region (e.g.  $300 \times 300 \text{ km}^2$ ) many measurement stations are needed. They are costly, and it takes a long time to obtain climatological estimates.

Mesoscale models are good tools to determine the wind climate for such regions. In addition, they can take advantage of the global data bases of the large-scale climate which are available, e.g. from the re-analyses projects at NCEP/NCAR (Kalnay et al., 1996), or ECMWF (Gibson et al., 1997). Mesoscale models are not well suited to predict the local wind climate.

The combination of KAMM and WAsP is illustrated in Figure 1. The way of preparing the input fields for WAsP from the results of the simulations with KAMM will be described in detail. The method has already been applied to Ireland (Frank and Landberg, 1997a,b). Results will be shown for other regions of Europe.

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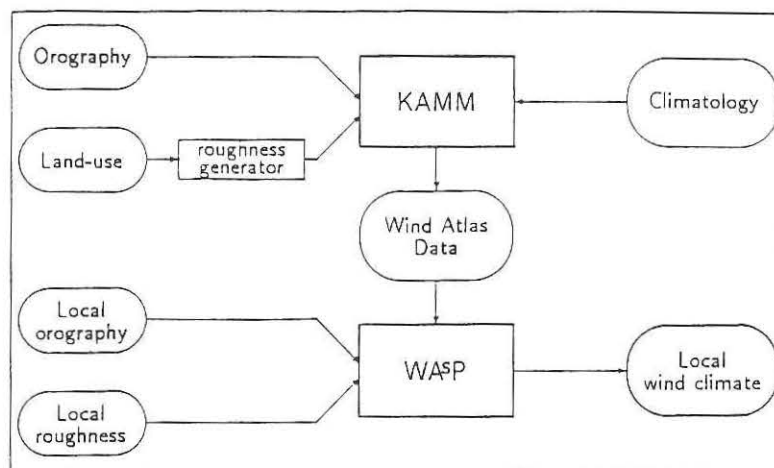


Figure 1: Schema of the combination of KAMM and WASP to calculate the local wind climate.

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